Claims

1. A method for machining workpieces by combining a machining tool with at least one additional machining tool, wherein at least one machining tool employs laser radiation, characterized in that a synchronized modulation of the first machining tool in the combination with the also pulse-modulated additional machining tool is carried out.

2. The method according to claim 1, characterized in that the first machining tool and the at least one additional machining tool are modulated with the same or with pulse frequencies that are an integral multiple relative to one another, and their pulse modulations are in a fixed or variably controlled or governed phase relationship.

3. The method according to claim 1 or 2, characterized in that the pulse control signals of at least one pulse-modulated machining tool are used as master signal for triggering a synchronized control of the pulse modulation of at least one additional machining tool in slave operation.

4. The method according to one of the claims 1 to 3, characterized in that the phase relationship is controlled and/or governed as a function of and/or for affecting one or several process parameters and/or as a function of sensor signals.

5. The method according to one of the claims 1 to 4, characterized in that in-phase synchronization is carried out.

6. The method according to one of the claims 1 to 5, characterized in that antiphase synchronization is carried out.

7. The method according to one of the claims 1 to 6, characterized in that the slave pulse is generated at the beginning or at the end of the master pulse or vice versa.

8. The method according to one of the claims 1 to 7, characterized in that individual pulses or pulse packages are generated.

9. The method according to one of the claims 1 to 8, characterized in that a machining tool that is optionally not externally controllable is used as the master.

10. The method according to one of the claims 1 to 9, characterized in that a machining tool that is internally process-controlled with variable pulse frequency is the master.

11. The method according to one of the claims 1 to 10, characterized in that the additional machining tool is a laser device and/or an electric arc radiation device and/or a plasma radiation device and/or one or several other energy, pulse, or particle sources.

12. The method according to one of the claims 1 to 11, characterized in that machining of materials is selectable from the following list:

- separation or removal methods, in particular, cutting, drilling, material removal, perforations, scoring, engraving, structuring, or cleaning;
- joining methods, in particular, welding, soldering or bonding,
- coating and building processes, in particular, coating, generating, selective sintering, or rapid prototyping,
- surface treatment and surface finishing, in particular, hardening, refining, alloying, dispersing, polishing and applying lettering, shaping, and bending,

wherein the combination of the machining tools is configured such that their active areas that are exposed optionally to effects of very different kinds, on or within the workpiece overlap or adjoin one another immediately during the machining process.

13. A device (10) for hybrid processing of materials by a machining tool in combination with at least one additional machining tool, wherein at least one machining tool employs laser radiation, characterized by a first pulse generator (12) for modulation of the laser radiation, by a second pulse generator (14) for modulation of the additional machining tool, and by a synchronizer (16) for synchronous modulation of the combination.

14. The device (10) according to claim 13, characterized in that the pulse generators (12, 14) and the synchronizer (16) are designed to modulate the laser radiation and the at least one additional machining tool with same or with pulse frequencies that are an integral multiple relative to one another, and that the modulation of the pulse generator (12, 14) is in a fixed or variable phase relationship that is variably controlled or governed by the controller (18).

15. The device (10) according to claim 13 or 14, characterized in that by means of at least one first and a second source (20, 22) pulse control signals of the at least one pulse generator (12) are processed as master signal for triggering a synchronous control of the pulse modulation of the pulse control signals of the at least one additional pulse generator (14) in slave operation, or vice versa.

16. The device (10) according to one of the claims 13 to 15, characterized by input devices for process parameters and by sensors for process results for controlling and/or governing the phase relationship as a function of and/or for

affecting one or several process parameters and/or as a function of sensors signals.

17. The device (10) according to one of the claims 13 to 16, characterized in that the synchronizer (16) is designed for in-phase synchronization.

18. The device (10) according to one of the claims 13 to 17, characterized in that the synchronizer (16) is designed for antiphase synchronization.

19. The device (10) according to one of the claims 13 to 18, characterized in that the synchronizer (16) is designed for generating a slave pulse at the beginning or at the end of the master pulse.

20. The device (10) according to one of the claims 13 to 19, characterized in that the pulse generators (12, 14) are designed for generating individual pulses and/or pulse packages.

21. The device (10) according to one of the claims 13 to 20, characterized in that the additional radiation is a laser radiation and/or an electric arc radiation and/or a plasma radiation and/or one or several other energy, pulse, or particle sources.